

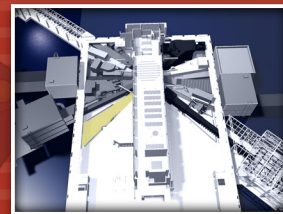
INSTRUMENT

BEAM LINE

9

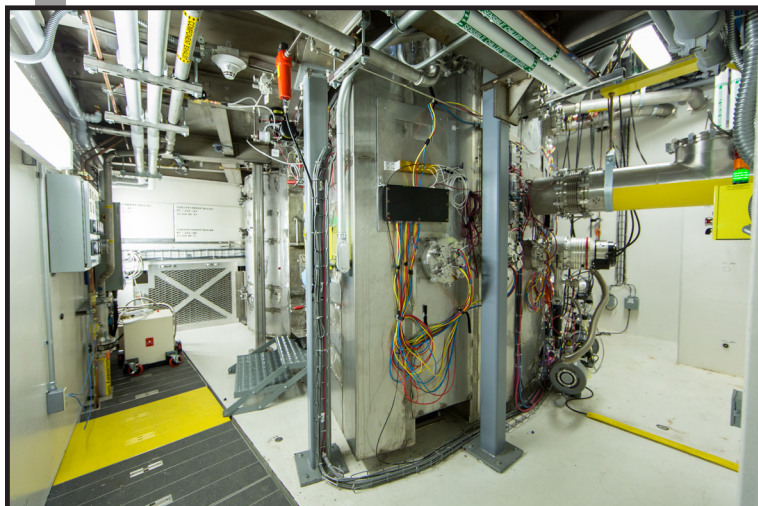
SPALLATION NEUTRON SOURCE

Fact Sheet



CORELLI – ELASTIC DIFFUSE SCATTERING SPECTROMETER

CORELLI is a statistical chopper spectrometer with energy discrimination. CORELLI is designed and optimized to probe complex disorder in crystalline materials through diffuse scattering of single-crystal samples. The momentum transfer ranges from 1 to 12 Å⁻¹, and the energy of incident neutrons ranges from 10 to 200 meV. This



instrument combines the high efficiency of white-beam Laue diffraction with energy discrimination by modulating the beam with a statistical chopper. A cross-correlation method is used to reconstruct the elastic signal from the modulated data. Accurate modeling of the short-range order associated with the diffuse scattering requires measurements over large volumes of three-dimensional reciprocal

space, with sufficient momentum resolution to distinguish the diffuse signal from the strong Bragg peaks.

APPLICATIONS

- Diffuse scattering in material science, including colossal magnetoresistance materials, ferroelectric relaxors, and fast ion conductors
- Diffuse scattering in condensed matter physics, including high-temperature superconductors, geometrically frustrated systems, and quantum critical phenomena
- Diffuse scattering in molecular systems including molecular solids and microporous framework systems

SPECIFICATIONS

| | |
|------------------------------|--|
| Moderator | Ambient H ₂ O decoupled poisoned |
| Source-to-sample distance | 20 m |
| Sample-to-detector distance | 2.5 m |
| Anular coverage | -21.9 to +148.2° horizontally ±28.5° vertically |
| Energy resolution | ΔE/E _{inc} ~ 8% (FWHM) at E _{inc} =100 meV |
| Momentum resolution | ΔQ/Q ≤ 7x10 ⁻³ at 90° at Q=10 Å ⁻¹ |
| Incident energy range | 10–200 meV |
| Momentum transfer | 1–12 Å ⁻¹ |
| Beam size at sample position | ~ 1 cm ² |
| Minimum solid angle coverage | 0.8 sr |

Status: Commissioning

FOR MORE INFORMATION, CONTACT

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